4.2 Public Benefits Funds for Energy Efficiency

Policy Description and Objective

Summary

Many states are finding PBFs to be an effective mechanism for securing investment in cost-effective energy efficiency, resulting in lower cost and cleaner energy. PBFs in 17 states and Washington, D.C. provide nearly $1 billion annually for energy efficiency and related programs. States with restructured as well as traditional electricity markets are using PBFs as a component of their clean energy policy portfolios.

PBFs, also known as system benefits charges (SBCs) or clean energy funds, are typically created by levying a small charge on every customer's electricity bill. These funds provide an annual revenue stream to fund energy efficiency programs. The charges range from 0.03 to 3 mills[12] per kilowatt-hour (kWh) and are equivalent to about $0.27 to $2.50 on a residential customer's monthly energy bill (ACEEE 2004b). Where there are comprehensive, statewide programs in place, funding levels range from about 1 to 3% of total utility revenues.

PBFs were originally developed during the 1990s to help fund public benefit programs for energy efficiency, clean energy supply, and low-income electricity bill assistance. Utilities had become hesitant to invest in clean energy activities, anticipating restructuring of electricity markets that would shift incentives and alter requirements. In many cases, states that restructured their electricity markets instituted PBFs to address the critical needs exposed by this decline in utility investments. Despite the creation of PBFs, funding for energy efficiency and diversified energy supply in many states is still below the funding levels of the early 1990s, but has increased overall in recent years (ACEEE 2004b, ACEEE 2004c, ACEEE 2005a).

A well-designed and administered public benefits fund (PBF) increases public and private sector investments in cost-effective energy efficiency, resulting in reduced energy costs for electricity customers, emission reductions, and enhanced reliability.

Total ratepayer-funded electric energy efficiency program spending (including PBF programs and other programs funded via customer bills) reached $1.35 billion in 2003. In nominal dollars, this was the highest level spent on electric energy efficiency programs since 1996 (ACEEE 2005a). However, in real dollars, the level of funding in nearly every state is still below the levels of the early 1990s.

States are finding that PBFs provide significant reductions in electricity demand and related emissions at a relatively low cost. For just 12 of the states with energy efficiency PBFs, total annual investments of about $870 million in 2002/2003 yielded nearly 2.8 million MWh of electricity savings. Emission reductions from nine of these states included a total of 1.8 million tons of carbon dioxide (CO_2). The median program cost was $0.03 per kWh saved, which is one-half to three-quarters of the typical cost of new power sources and less than one-half of the average retail price of electricity (ACEEE 2004a, ACEEE 2004b, EIA 2005).

Seventeen states and Washington, D.C. have adopted PBFs that provide nearly $1 billion in support annually for energy efficiency and have yielded over 2.8 million MWh in annual electricity savings (ACEEE 2004b).

Objective

The objectives of PBF programs for energy efficiency include:

- Saving energy and avoiding new generation through long-lasting improvements in energy efficiency.

[12] 1 mill = one-tenth of a cent.

- Lowering energy demand and reducing air pollutant and greenhouse gas emissions.
- Reducing customers' energy costs.

Most states also use their PBFs to support development of clean energy supplies, such as renewable energy and combined heat and power (CHP), provide assistance to low-income consumers, support consumer education, and support research and development of new clean energy technologies (see Chapter 5, *Energy Supply Actions*).

Benefits

Well-designed and administered PBFs have been shown to reduce energy demand at a lower cost (see Figure 4.2.1) than new supply and deliver a variety of benefits. They reduce energy costs for utility customers by reducing average bills and by limiting future energy price increases. They also improve the reliability of the electricity grid and reduce emissions. Some states use PBF dollars to support research and development related to clean energy technologies and processes.

Figure 4.2.1: Cost of Energy Saved (cents/kWh) for Six State Public Benefits Funds

Source: ACEEE 2004b.

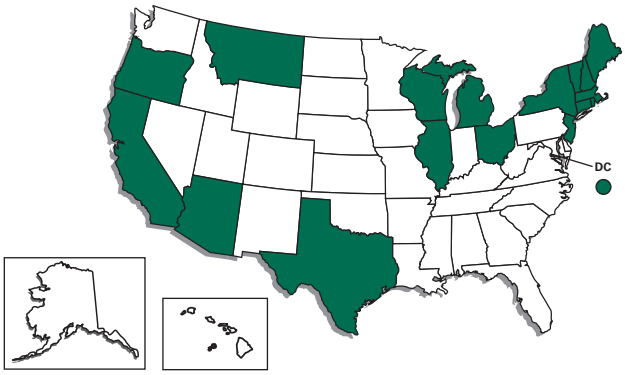
Funding levels for comprehensive programs generally range from 1 to 3% of total utility revenues. On average, each percent of revenues invested yields about 5% in cumulative energy savings over five years and 10% over 10 years (ACEEE 2004b). While the percent of revenues spent is not the only factor affecting the impact of efficiency programs, it provides an indication of the magnitude of savings that states can expect.

PBFs have also been shown to help create jobs by lowering energy costs and stimulating new public and private sector investments. Recent analyses of the New York Energy $mart Program show that the program creates and sustains 4,700 jobs, increases labor income by $182 million per year, and increases economic output by $224 million per year (NYSERDA 2004a).

States with Energy Efficiency PBFs

Seventeen states and Washington, D.C. (shown in Figure 4.2.2) have established PBFs to support energy efficiency at various levels of funding. Eleven of the states have programs that are actively promoting energy efficiency, making investments at or above the median level of about 1 mill/kWh.

Figure 4.2.2: States with PBFs for Energy Efficiency



Sources: ACEEE 2004b, ACEEE 2004c.

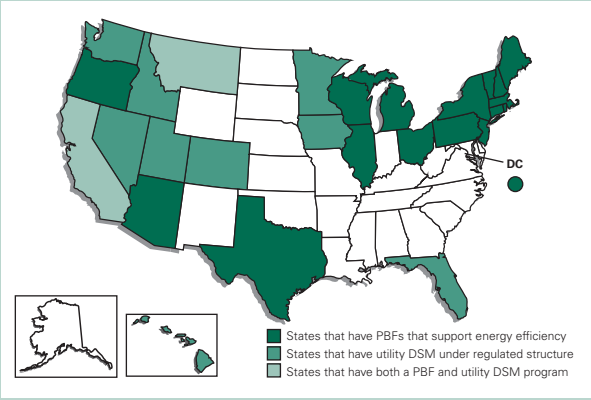
Notes: Nevada's program, originally introduced under a now-repealed electricity restructuring process, is not technically a PBF. As of 2003, energy efficiency funding is approved as part of utility IRP (ACEEE 2004b).

Texas's program is tied to the state's utility energy efficiency savings targets and costs are covered through a non-bypassable charge in transmission and distribution rates. (See Section 4.1, *Energy Efficiency Portfolio Standards*.) The utilities submit rate filings to the utility commission to cover estimated costs (ACEEE 2004b).

Figure 4.2.3: Ratepayer-Funded Energy Efficiency Programs

PBFs are the most prevalent mechanism for supporting ratepayer-funded energy efficiency programs. States also support energy efficiency through utility demand-side management,[a] including the approval of tariff riders or the inclusion of energy efficiency program costs in the rates supervised by the public utility commission (PUC) or equivalent regulatory body. Some states, such as California and Montana, undertake a combination of these approaches. Most of the PBFs for energy efficiency were created as part of a state's electricity market restructuring process. Some states (e.g., California and Nevada) have repealed the restructuring process, at least in part, leading to a hybrid or modified approach to funding energy efficiency. Public benefit funds were also created in states that did not restructure, including Wisconsin and Vermont. (See also *Interaction with State Policies, Utility Policies,* on page 4-27.)

The following map illustrates the different funding arrangements that states are using to support energy efficiency.[b, c]



a Utility DSM programs included in the map are for states where energy efficiency spending as a percentage of revenues is greater than 0.25% (ACEEE 2005a).

b Nevada's program, originally introduced under a now-repealed electricity restructuring process, is not technically a PBF; as of 2003, the energy efficiency funding is approved as part of utility Integrated Resource Planning (IRP) (ACEEE 2004b).

c Texas's program, created as part of a restructuring process, is tied to the state's utility energy efficiency savings targets and costs are covered through a non-bypassable charge in transmission and distribution rates. (See Section 4.1, *Energy Efficiency Portfolio Standards.*) The utilities submit rate filings to the PUC to cover estimated costs (ACEEE 2004b).

Sources: ACEEE 2004b, ACEEE 2004c, ACEEE 2005a, ACEEE 2005b.

Most of the states have implemented electricity restructuring. However, restructuring is not a prerequisite for establishing a PBF. Some states, including Wisconsin, Vermont, and Oregon, have kept retail markets largely regulated and have also created PBFs to provide the public benefits described above. California has rescinded its restructuring process but continues to use PBFs. In some states, moving to a PBF model from traditional regulated efficiency programs reflects the changing roles of utilities in retail markets, while delivering the benefits of efficiency through other channels. This mixture of approaches to ratepayer-funded energy efficiency programs is described in Figure 4.2.3.

Designing an Effective PBF Program

This section identifies several key issues that states consider when designing an effective PBF. These issues include identifying key participants and their roles; determining appropriate funding levels; and determining the appropriate duration of a PBF, what portfolio of activities to choose, and interaction with other state and federal policies.

Participants

- *State Legislatures.* In most states, the state legislature authorizes and periodically reviews PBFs program implementation status, funding levels, and results. They enact legislation to set up the PBF, identify goals and objectives, determine the charge, specify implementing and oversight organizations, and review program authorization at specified intervals.
- *Ratepayers.* PBFs are funded by ratepayers, typically through a "non-bypassable" charge on distribution services, so that all customers pay irrespective of the supplier. A handful of states (i.e., Montana, Oregon, Vermont) have included limited provisions for large industrial customers to obtain a credit or refund based on documented spending on efficiency (ACEEE 2004b).
- *Utilities.* Utilities play a role in processing the charges, potentially administering the fund, and in many cases implementing energy efficiency

measures. They also are important sources of data for reporting results.

- *PUCs and Third-Parties.* Depending on the state, PUCs or nonprofit organizations may also play a role by administering and/or evaluating the PBFs.
- *Public and Private Sector Organizations.* State PBF investments also leverage additional public and private sector energy and efficiency investment. Studies indicate that each $1 spent from the fund leverages roughly $3 in related business and consumer investment (ACEEE 2004c).

Funding

- *Mechanism.* Most states apply a system-wide charge (usually in mills/kWh) that applies to all electricity customers. Some states have developed alternative funding structures, including flat monthly fees, utility-financed programs, and performance goals. The mills/kWh mechanism is the most common, the simplest, and the most transparent.
- *Funding Level.* The funding level for energy efficiency-related programs ranges between 0.033 and 3 mills/kWh in the most active states (ACEEE 2004b). Table 4.2.1 shows the funding level by state, and total annual funding for energy efficiency for the 11 most active states (those whose spending is at or above the median of about 1 mill/kWh).
- *Allocation of PBF Resources.* The degree to which the program administrator will be able to reallocate program dollars within the portfolio once it has been approved by the PUC or other oversight authority has been an important issue for states. This flexibility has proven important because field experience often indicates needs to adjust the program portfolio in terms of design, funds allocation, or both. If an administrator has to obtain approval for any change in use of funds, program operations could be delayed, or could result in reduced impacts or eroded cost-effectiveness. For instance, California has provided utilities with more flexibility in recent administrative rulings.

Table 4.2.1: Comparison of 11 State PBFs for Energy Efficiency
(sorted by charge level at 1 mill/kWh and greater)

	CT	VT	MA	RI	NH	ME	CA	NJ	OR	WI	NY
Administrative mechanism											
State			●			●	●	●		●	●
Utility	●		●	●	●		●				
Third-party		●							●		
Funding level (mills/kWh)	3.00	2.90	2.50	2.30	1.80	1.50	1.30	1.30	1.26	1.15	1.02
Annual funding for energy efficiency ($ millions)	$87	$17	$117	$15	$15	$15	$280	$89	$40	$62	$87
% of revenue to energy efficiency programs	3.0	3.4	2.5	2.3	1.52	1.3	2.3	1.35	2.0	2.3	0.75
Total funding—all programs ($ millions)	$118	$17	$141	$15	$25	$21	$580 (includes procurement)	$129	$70	$115	$150

Key: ● = primary fund administrator.

Sources: ACEEE 2004c, CEC 2005.

- *Administration and Cost Recovery.* A PBF essentially serves as a means for cost recovery in place of the traditional rate case that utilities undergo for a demand-side management (DSM) program. There are two basic approaches for administering the funding collected under a PBF, both of which can affect how costs are recovered. Under the first and most common approach, money is collected and spent during the current year, in an expenses-based mode. If there is an under- or over-collection, it floats in an account, and is adjusted in the following year. This account may be controlled by a utility or a third-party administrator, depending upon the type of administering body. (See also *Administering Body* on page 4-28.) The second approach is to use the money collected in the PBF to capitalize a revolving fund for grants and loans, which is replenished or expanded with new PBF collections.

Timing and Duration

Some states leave the duration of the fund open-ended, while others stipulate operational periods ranging from three to 10 years. None of the states have discontinued their PBFs, even when the initial implementation period ended.

In the past, it was not uncommon to have short, even annual, program approval cycles. This short cycle took substantial time and resources away from program delivery, and created uncertainty in customer markets. More recently, the trend is toward multi-year approval cycles. Many states have found that longer cycles reduce administrative costs and allow programs to operate more effectively in the market.

PBFs are sometimes redirected to meet other state needs during the budget process in lean years. While there is no foolproof method to avoid funding being shifted to other purposes, some states have used legislative language to avoid it. For example:

- *Vermont.* "Funds collected through an energy efficiency charge shall not be funds of the state, shall not be available to meet the general obligations of the government, and shall not be included in the financial reports of the state" (State of Vermont 1999a).
- *Washington, D.C.* "All proceeds collected by the electric company…shall not at any time be transferred to, lapse into, or be commingled with the General Fund of D.C. or any account of D.C." (Washington, D.C. 2004).

One way states are keeping PBFs targeted to energy efficiency is to use statistical information to educate stakeholders about the energy, economic, and environmental benefits of the PBF. Ensuring adequate, consistent, and stable funding is critical for the success of the program and to ensure the continuing participation of the private sector.

Developing a Portfolio of Activities

Targeting Efficiency Investments

States use PBFs to support a variety of program approaches to increasing the use of energy-efficient products and technologies and reducing energy consumption. Approaches include rebate (or "buy-down") programs for energy-efficient appliances and equipment, programs that offer technical assistance and financial incentives to encourage investment in energy-efficient technologies and assist with installation, and efforts at market transformation including disseminating information to increase consumer energy awareness and permanently change energy-related decisionmaking. (See Section 3.4, *Funding and Incentives*, for more detail on some of these options.)

States may also use PBFs to support load management programs that encourage reductions in energy use and shifts from on-peak to off-peak periods, to address concerns with prices and system reliability, but such shifts may not be accompanied by net reductions in energy use (NYSERDA 2005).

States use several criteria for choosing which energy efficiency measures are supported by their PBF program. They include the following:

- Customer classes served by the measure.
- Distribution of benefits across customer classes and service territories.

- Cost-effectiveness of individual measures and the overall program portfolio.
- Other social and environmental benefits (e.g., serving low-income customers, reducing criteria pollutants, and managing load and improving reliability of the electricity grid).

Factors such as whether an efficiency measure also delivers energy reductions at peak times, reduces water consumption, or offers other nonenergy benefits are also taken into consideration. Many efficiency PBFs also invest a portion of their funding in research and development programs to identify and verify the performance of emerging technologies, practices, or innovative program models.

PBF programs seek to benefit all customers and customer classes. However, resource limitations typically result in programs targeting the most cost-effective opportunities for energy savings. States served by multiple utilities may also need to ensure that customers in each utility's service territory receive direct benefits, proportional to the amount their customers have paid into the system.

In addition to benefit-cost analysis, PBF administrators also use other criteria to guide program design and investments, such as customer equity and serving hard-to-reach customer markets. The least expensive energy savings are often found in large commercial and industrial customers. However, for customer equity reasons, most PBF program portfolios seek to reach a range of customer groups, including low-income, small business, and other submarkets where lowering energy costs is especially important.

In addition to needing to serve multiple customer classes, some of which are harder or more expensive to reach, program administrators typically balance their efficiency programs based on the same principles that one would use in evaluating a stock portfolio.

- How reliable is the investment?
- When will it achieve savings?
- How long will those savings last?
- What other investments/strategies need to be considered to offset risk?
- Is it wise to include some long-term investments?

Some states target a portion of their efficiency investments to heavily populated areas or business districts to help alleviate transmission congestion and offset or postpone transmission infrastructure investments. For example, Connecticut's Conservation and Load Management Fund targets funding to address transmission congestion problems in southwest Connecticut. By linking actions to load management programs, states can use PBFs to help prevent brownouts and ensure reliable energy supply, which benefits all electricity customers.

Determining Cost-Effectiveness

Many states incorporate cost-effectiveness analysis into the design and evaluation of their programs. This helps ensure the effective use of public funds and can be used to compare program and technology performance with the aim of developing effective future programs. Cost-effectiveness tests commonly used by states are shown in Table 4.2.2. Many states use a Total Resource Cost (TRC) Test as the basic economic assessment tool. The TRC Test assesses the net lifetime benefits and costs of a measure or program, accounting for both the utility and program participant perspectives. As with other cost-effectiveness tests, if the benefit-cost ratio is greater than one, it is deemed to be cost-effective. If applied at a portfolio level, individual measures and programs can then be further screened based on the extent to which benefits exceed costs and on other portfolio considerations mentioned previously.

Sometimes states use a combination of tests to examine the program impacts from different perspectives. States wishing to consider the non-electric implications for energy use and energy savings may use the Societal Test, which incorporates a broader set of factors than the TRC Test. The Program Administrator and Participant Tests are sometimes used to help design programs and incentive levels, rather than as a primary screen for overall cost-effectiveness.

Table 4.2.2: Common Cost-Effectiveness Tests

Type of Test	Description
Total Resource Cost Test	Compares the total costs and benefits of a program, including costs and benefits to the utility and the participant and the avoided costs of energy supply.
Societal Test	Similar to the TRC Test, but includes the effects of other societal benefits and costs such as environmental impacts, water savings, and national security.
Program Administrator Test	Assesses benefits and costs from the program administrator's perspective (e.g., benefits of avoided fuel and operating and capacity costs compared to rebates and administrative costs).
Participant Test	Assesses benefits and costs from a participant's perspective (e.g., reductions in customers' bills, incentives paid by the utility, and tax credits received as compared to out-of-pocket expenses such as costs of equipment purchase, operation, and maintenance).
Rate Impact Measure	Assesses the effect of changes in revenues and operating costs caused by a program on customers' bills or rates.

Source: UNEP 1997.

If using only one test, states are moving away from the Rate Impact Measure (RIM) test because it does not account for the interactive effect of reduced energy demand from efficiency investments on longer-term rates and customer bills. Under the RIM test, any program that increases rates would not pass, even if total bills to customers are reduced. In fact, there are instances where measures that increase energy use pass the RIM test.

While many utilities and PUCs express program performance in terms of benefit-cost ratios, expressing program costs and benefits in terms of $/kWh is also useful because it is easy to relate to the cost of energy. Consumers and legislators can easily relate this metric to the cost of energy in their own area, while utilities and regulators can compare this value to the cost of other resources, such as new generation. When expressed this way, the annual levelized TRC in $/kWh captures the net program and customer costs divided by the projected lifetime savings of the measure or program. Resource costs can also be calculated in $/kW to illustrate the value during periods of peak demand. (See also Section 6.1, *Portfolio Management Strategies.*)

Interaction with Federal Policies

Several federal programs can help support the programs administered through PBFs.

The ENERGY STAR Program

ENERGY STAR is a voluntary, public-private partnership designed to reduce energy use and related greenhouse gas emissions. The program, administered jointly by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE), has an extensive network of partners including equipment manufacturers, retailers, builders, energy service companies, private businesses, and public sector organizations.

Since the late 1990s, EPA and DOE have worked with utilities, state energy offices, and regional nonprofit organizations to help them leverage ENERGY STAR messaging, tools, and strategies and enhance their local energy efficiency programs. Today more than 350 utilities and other efficiency program sponsors, servicing 60% of U.S. households, participate in the ENERGY STAR program.

EPA and DOE invest in a portfolio of energy efficiency efforts that state and utility run energy efficiency programs can leverage to further their PBF programs, including:

- *Education and Awareness Building*. ENERGY STAR sponsors broad-based public campaigns to educate consumers on the link between energy use and air emissions and to raise awareness about how products and services carrying the ENERGY STAR label can protect the environment while saving money.
- *Establishing Performance Specifications and Performing Outreach on Efficient Products.* More than 40 product categories include ENERGY STAR-qualifying models, which ENERGY STAR promotes through education campaigns, information

exchanges on utility-retailer program models, and extensive online resources. Online resources include qualifying product lists, a store locator, and information on product features.

- *Establishing Energy Efficiency Delivery Models to Existing Homes.* ENERGY STAR assistance includes an emphasis on home diagnostics and evaluation, improvements by trained technicians/building professionals, and sales training. It features online consumer tools including the Home Energy Yardstick and Home Energy Advisor.
- *Establishing Performance Specifications and Performing Outreach for New Homes.* ENERGY STAR offers builder recruitment materials, sales toolkits and consumer education, and outreach that helps support builder training, consumer education, and verification of home performance.
- *Improving the Performance of New and Existing Commercial Buildings.* EPA has designed an Energy Performance Rating System to measure the energy performance at the whole-building level, to help go beyond a component-by-component approach that misses impacts of design, sizing, installation, controls, operation, and maintenance. EPA uses this tool and other guidance to help building owners and utility programs maximize energy savings.

The State Energy Program

DOE offers a range of financial and technical assistance programs that support state efficiency programs. The State Energy Program administered by DOE offers grants to states to implement energy programs. State energy offices can leverage PBFs by coordinating activities with state energy programs. DOE's Weatherization Assistance Program (WAP) enables low-income families to permanently reduce their energy bills by making their homes more energy efficient.

Interaction with State Policies

PBFs can be used to leverage existing state-administered programs, such as traditional utility-based energy efficiency programs, and support other state policies, such as building codes.

Best Practices: Developing and Adopting a PBF Policy

The best practices identified below will help states develop effective PBF programs. These best practices are based on the experiences of states that have highly effective PBFs for energy efficiency.

- Determine the cost-effective, achievable potential for energy efficiency in the state.
- Start with low-cost, well-established programs and efficiency investments, and build the program over time.
- Assess the level and diversity of support for a PBF. Engage key stakeholders (i.e., utilities; residential, commercial and industrial customers; municipalities; and environmental groups) and experts collaboratively to help design the program—including its administering organization, funding, duration, and evaluation methods.
- Design PBF legislation that sets a universal, non-bypassable SBC on utility bills. Set the charge at a rate that captures the available energy efficiency potential in the state. Consider specific language to prevent PBF funds from being commingled with general state budget funds, and to clarify that the SBC establishes a minimum level of investment in energy efficiency, not a cap on investments.
- Ensure that the PBF program serves the needs of diverse customer classes and stakeholder groups.
- Take care to select the most appropriate administering organization. The options include utilities, state agencies, or independent organizations. Each can be effective under the right conditions. Having a single entity administer the program statewide can maximize resource efficiency.
- Set the duration of the PBF for an extended period (five to 10 years is becoming common). This provides the continuity and certainty needed to attract private sector investment.
- Establish effective evaluation methods that build on proven approaches. Evaluation methods should be rigorous enough to estimate program impacts and other benefits, and simple enough to minimize administrative costs.

States that are concerned that their PBFs do not capture all of the cost-effective energy efficiency that is available are exploring how procurement requirements, portfolio management, or establishing

energy efficiency portfolio standards (EEPS) (see Section 4.1, *Energy Efficiency Portfolio Standards*) can help maximize the savings for their businesses and residents.

Utility Policies

PBFs can complement other state energy efficiency investments. In many states, PBFs supplanted energy efficiency programs that had been required by state utility commissions under IRP requirements. Some states, mostly those that have not restructured their electricity markets, still practice IRP and require regulated DSM programs for energy efficiency as utility resource investments. Washington still practices IRP and DSM, and Wisconsin and Oregon—while not restructuring retail markets—have shifted to a PBF efficiency program model. These non-restructured states are using PBFs to enhance funding for energy efficiency programs and ensure that programs are equitably distributed across customer classes.

In some states, a hybrid regulatory approach called portfolio management (PM) is evolving from traditional integrated resource plans. PM recognizes that utilities, under commission oversight, act as resource portfolio managers on behalf of its many customers. Under PM, a commission might elect to use a PBF to provide customers additional choices for energy efficiency investment and to balance the state's overall resource "portfolio" (see Section 6.1, *Portfolio Management Strategies*).

PBFs can also be combined with other resource acquisition strategies to ensure that cost-effective energy efficiency is pursued as part of the resource mix. California, for example, despite no longer operating as a restructured market, sustained its PBF and also developed new efficiency procurement requirements for utilities. The California Public Utilities Commission (CPUC), through the energy action plan (EAP), has established a "loading order" of energy resources for meeting future load growth. The loading order (1) minimizes increases in electricity and natural gas demand through energy efficiency and conservation measures, and (2) prioritizes renewable energy and clean distributed generation for meeting future load growth, followed by clean fossil-fired generation. The four investor-owned utilities (IOUs) are required to procure future energy supply for the state using a combination of utility resource procurement funds and revenues from the PBF.

In addition, states are examining how PBFs may serve as the "ceiling" level for energy efficiency, rather than the "floor." In at least one state, the legislature capped energy efficiency funding at the level of the PBF. The concern is that this places artificial limits on the level of energy efficiency investments and may reduce opportunities for additional measures that are cost-effective and serve other public purposes (e.g., reliability support, job development). The Vermont legislature recently removed its "ceiling" provision (State of Vermont 2005).

Building Codes

PBF programs can be coordinated with energy codes for new and renovated buildings. For example, some states are using PBFs to support code implementation and enforcement. The New York State Energy Research and Development Authority (NYSERDA) offers financial incentives to building owners and leaseholders to improve the energy efficiency of new and existing construction. Other states, such as Illinois and Wisconsin, are using PBF resources to enhance voluntary new and existing buildings programs used to document code compliance. (See Section 4.3, *Building Codes for Energy Efficiency*, for more information.)

Program Implementation and Evaluation

State policymakers are responsible for determining who will implement the PBF and evaluate the program. The responsibilities of the administering organization include the following:

- Establish program goals, in terms of both process and outcomes.
- Set detailed funding levels for each program area (e.g., energy efficiency, renewable energy, CHP, low-income).
- Deliver energy efficiency field programs, and any related activities, such as research and development activities.

- Practice fiscal and project management that keep programs accountable and support attainment of objectives.

Program evaluation is either overseen by the program administrator, the PUC or other oversight authority, or a combination of the two. In most cases, these organizations outsource evaluation activities to independent third-party experts to minimize potential conflict of interest.

Administering Body

PBFs are placed under the control of an administrator, often with advisory oversight by an internal or external board. The organizational structures used to administer the PBF vary by state (see Table 4.2.1 on page 4-22). The administrative approaches used include:

- Utility (e.g., Arizona, Massachusetts, Rhode Island).
- State government agency (e.g., Illinois, Maine, Michigan, New Jersey, New York, Ohio, and Wisconsin).
- Nonprofit (third-party) organization (e.g., Oregon, Vermont). Oregon established a nonprofit organization based on action by the Oregon PUC; Vermont selected a nonprofit organization as part of a competitive process that included for-profit bidders.
- Hybrid category involving more than one of the preceding organizations. For example, a utility may administer the program with guidance and oversight by a state agency (e.g., California, Connecticut, and Montana).

States have developed effective programs using each administrative model; institutional history typically determines the entities best suited to administer programs. In many states, utilities have the capital, personnel, and customer relations channels that enable them to reach broad customer markets effectively. Thus, they are the most common administering entity.

However, in some states utilities might have little or no institutional history with energy efficiency. In others, state legislatures or utility commissions might express strong views toward other types of program delivery. In such situations, state agencies or nonprofit organizations may be an appropriate administrator.

Best Practices: Implementing PBF Programs

- Learn from other states' experiences to identify most cost-effective ways to achieve energy efficiency through PBF programs.
- Consider a range of potential organization(s) for program delivery and select the most appropriate.
- Approve long-term funding cycles (five to 10 years) to let programs build market experience.
- Involve key stakeholders and experts in a collaborative design effort.
- Base program designs on market characteristics and customer needs.
- Keep program designs simple and clear.

Some states have looked to independent organizations to administer PBFs. This decision may reflect a sense that this will help obtain maximum performance from program funds and avoid potential conflicts of interest (i.e., utilities whose revenues remain tied to sales may be reluctant to promote energy efficiency programs that may reduce their revenues). In some states, commissions are breaking the link between utilities' revenues and sales, thereby removing utilities' disincentive for investments in energy efficiency (see Section 6.2, *Utility Incentives for Demand-Side Resources*). Some states are also finding that it is appropriate to have different organizations administer specific energy efficiency programs funded by the PBF based on the market being served.

Evaluation

Evaluation is important for sustaining success and support for the PBF program and for helping determine future investment strategies. Unless program overseers show concrete and robust results in line with stated objectives, decisionmakers may not reauthorize the program, or it may become vulnerable to funding shifts or other forms of erosion. State policymakers have incorporated evaluation requirements as they develop their PBF program and after the program

has been implemented. When evaluating PBFs, several states have examined the TRC of the aggregated programs supported by the PBF (see section on *Determining Cost-Effectiveness* on page 4-24).

New York conducts an extensive evaluation of its PBF program. NYSERDA recently conducted a rigorous evaluation of its PBF program, including the following activities (NYSERDA 2004a):

- Identifies program goals and key output and outcome measures that provide indicators of program success.
- Reviews measurement and verification (M&V) protocols used to evaluate programs and verifies energy savings estimates to determine if they are reasonably accurate.
- Evaluates the process to determine how and why programs deliver or fail to deliver expected results.
- Characterizes target markets, determines changes observed in the market, and identifies to what extent these changes can be attributed to PBF-funded programs.
- Regularly communicates the benefits of the overall program and results of individual programs to decisionmakers and stakeholders.
- Refines program delivery models based on evaluation findings.

Other states that have conducted comprehensive evaluations of their PBF programs include California, Connecticut, Oregon, and Wisconsin. Key elements of these and other state evaluation programs are shown in the box on *Best Practices: Evaluating PBF Programs*.

Having access to detailed databases has also been a useful tool for evaluating current investments and determining future investments. For example, Efficiency Vermont maintains a database that records information on customer participation over time and allows for reporting on geographic and customer class results. Developing an arrangement to allow administrators to have access to this utility information can help improve the overall program.

Best Practices: Evaluating PBF Programs

- Evaluate programs regularly, rigorously, and cost-effectively.
- Use methods proven over time in other states, adapted to state-specific needs.
- Provide both "hard numbers" on quantitative impacts, and process feedback on the effectiveness of program operations and methods for improving delivery.
- Use independent third parties, preferably with strong reputations for quality and unbiased analysis.
- Measure program success against stated objectives, providing information that is detailed enough to be useful and simple enough to be understandable to nonexperts.
- Provide for consistent and transparent evaluations across all programs and administrative entities.
- Communicate results to decisionmakers and stakeholders in ways that demonstrate the benefits of the overall program, as well as individual market initiatives.
- Maintain a functional database that records customer participation over time and allows for reporting on geographical and customer class results.

State Examples

California

California has been a leader in energy efficiency policy and programs since the 1970s. It established the first major utility efficiency programs in the 1980s, and the first PBF in 1996. CPUC provides policy oversight of the state PBF. CPUC approves plans for efficiency programs in each of the utility service areas and also coordinates statewide activities. Further, CPUC requires utilities to use procurement funding to supplement the PBF in order to maximize cost-effective savings achieved through energy efficiency programs. The PBF is one part of a broader energy efficiency program entailing several policy initiatives, noted as follows.

As of 2004, California was the first state to establish cost-effective energy efficiency as the first option for acquiring new resources to meet future energy

demand, under its "loading order" rule. In January 2005, the CPUC adopted a new administrative structure in which the state's four IOUs are responsible for program selection and portfolio management, with input from stakeholders through Program Advisory Groups (CPUC 2005). This is a return to a pre-electric industry restructuring model, in which each IOU was responsible for procuring energy efficiency resources on behalf of their customers, subject to Commission oversight.

The CPUC has established energy efficiency goals to achieve a cumulative savings of 23,183 gigawatt-hours (GWh) per year; 4,885 MW of peak demand; and 444 million therms per year for the IOUs combined, by 2013 (see Section 4.1, *Energy Efficiency Portfolio Standards*).

In September 2005, the CPUC authorized $2 billion in funding for its 2006 to 2008 energy efficiency and conservation initiative. This represents the single largest funding authorization for energy efficiency in U.S. history. CPUC authorized funding levels and energy efficiency portfolio plans for Pacific Gas and Electric, Southern California Edison, San Diego Gas & Electric, and Southern California Gas. These portfolios include a mix of proven and new, innovative program designs and implementation strategies to be supported through ratepayer investments.

The measures associated with the approved funding are expected to avoid the equivalent of three large power plants (totaling 1,500 MW) over the next three years and over the life of the measures, yield an estimated $2.7 billion in net savings to consumers, and reduce greenhouse gas emissions by 3.4 million tons of CO_2 in 2008, or the equivalent of taking about 650,000 cars off the road.

The state's efficiency program design and administration approaches have been among the most detailed and innovative although initially they struggled with the complexity and coordination of multiple implementers. While utilities have remained administrators and portfolio managers of the programs with input from stakeholder working groups, program implementation is done by both utility and non-utility implementers, and statewide approaches to program design and evaluation have improved program performance.

Web site:
http://www.cpuc.ca.gov/static/industry/electric/energy+efficiency/ee_funding.htm

New York

The New Yorks SBC program—administered by NYSERDA—is a leading example of a well designed and effectively administered state PBF program. The PBF was established in 1996 with four specific policy goals:

- Improve system-wide reliability and increase peak electricity reductions through end-user efficiency actions.
- Improve energy efficiency and access to energy options for underserved customers.
- Reduce the environmental impacts of energy production and use.
- Facilitate competition in the electricity markets to benefit end users.

NYSERDA has invested more than $350 million in energy-efficiency programs and brought about an estimated additional investment of $850 million, for a total of $1.2 billion in public and private sector energy and efficiency related investments in the state. Over the eight-year implementation period (1998 to 2006), the program is expected to result in a total of $2.8 billion in new public and private investment in New York.

NYSERDA measures and tracks its PBF investments and conducts quarterly and annual evaluations of the Energy $mart program. It uses the findings to communicate the benefits of the program to its customers and stakeholders. NYSERDA analyzes the cost-effectiveness of the program, permanent and peak-load energy and cost savings to customers, economic impacts (including leveraged public and private sector investment and jobs created), and reductions of greenhouse gases and criteria pollutants. As of September 2004, the program had:

- Reduced electricity use by about 1,340 GWh per year; annual savings are expected to reach 2,700 GWh annually when the program is fully implemented.
- Generated $185 million in annual energy bill savings for participating customers, including electricity, oil, and natural gas savings from energy efficiency and peak load management services.
- Created 3,970 jobs annually, and is expected to result in an average net gain of 5,500 jobs per year during the eight years of program implementation from 1998 to 2006.
- Reduced nitrogen oxide (NO_x) emissions by 1,265 tons, sulfur-dioxide (SO_2) emissions by 2,175 tons, and CO_2 emissions by 1 million tons (the equivalent amount of energy required to power about 850,000 homes) (NYSERDA 2004b).

Web site:
http://www.nyserda.org

Oregon

Oregon is an example of a state that has not restructured its electricity markets, but has created a public benefits program designed to serve public needs for energy efficiency services. Rather than using utilities as the primary administrator for programs, Oregon uses the nonprofit Energy Trust of Oregon as a dedicated organization to coordinate program design, evaluation, and delivery across the state. The Trust administers the state PBF in coordination with the PUC, providing cash incentives and financial assistance to promote energy efficiency and renewable energy.

While the PBF program is relatively new in Oregon, it builds on the success of other programs, such as Vermont's nonprofit delivery model, and the Northwest Energy Efficiency Alliance's market transformation programs. While utility administration is the most common model used in state PBFs, Oregon and Vermont have shown that a nonprofit structure can be equally effective.

The Energy Trust's programs, which started later than many states' efforts, saved 280 million kWh and 208,000 therms of gas by 2003, enough energy to power 23,000 homes. Its 2012 goal is to save 26 billion kWh and 19 million therms, enough to power over 200,000 typical homes.

Oregon is also one of the few states that supports both electricity and natural gas efficiency programs, and that complements its PBF program with ratemaking policies that maintain utility revenues while promoting energy use reductions.

Web site:
http://www.energytrust.org/

Wisconsin

Focus on Energy is a public-private partnership funded by the state PBF. The program's goals are to encourage energy efficiency and use of renewable energy, enhance the environment, and ensure the future supply of energy for Wisconsin.

A recent independent evaluation of the Wisconsin's Focus on Energy program showed the program is delivering the following energy, environmental, and economic benefits:

- The Focus on Energy program realized a total lifetime energy savings of $214.5 million during fiscal year 2004 for a program benefit:cost ratio of 5.4 to 1. These benefits were achieved through an annual electric energy savings of 235.6 million kWh ($113.1 million in lifetime savings), a reduction in electricity demand of 35.5 megawatts ($36.4 million in lifetime savings), and savings of 14.4 million therms from natural gas efficiency measures ($65 million in lifetime savings). See the *Evaluation* section on page 4-28 for more information.
- Wisconsin environmental benefits include estimates of the following avoided emissions: 1.5 million pounds of NO_x, 2.9 million pounds of sulfur oxides (SO_x), 687.3 million pounds of CO_2, and 12 pounds of mercury (Hg) (WI DOA 2004).

Economic benefits from the Wisconsin program include the creation of 1,050 full-time jobs. Wisconsin businesses saved almost $14.6 million and increased sales by $76.7 million. Wisconsin residents saved almost $20 million and increased their personal income by $18.3 million.

Web site:
http://www.focusonenergy.com/

What States Can Do

Experience from the states with PBFs for energy efficiency demonstrates that PBFs can be an effective mechanism for securing investment in cost-effective energy efficiency programs and thereby meeting important state energy objectives. Other states can improve their energy efficiency investments by examining the role PBFs can play in helping capture a significant portion of the cost-effective clean energy in their state. States can use the best practices and information resources in this guide to establish a new PBF or strengthen existing programs to deliver even greater benefits.

Action Steps for States

The following four steps can be used both by states interested in developing a new PBF program or those interested in strengthening an existing program.

- *Assess Energy Efficiency Potential.* States can begin the process by assessing current levels of energy efficiency spending within their state, analyzing all of their options for achieving greater levels of efficiency, and analyzing the energy and cost savings that a PBF would offer.
- *Determine Program Funding Needed to Capture Cost-Effective Energy Efficiency.* Consider appropriate PBF funding levels, and avoid diversion of funds for other purposes. Studies show energy efficiency spending could be increased significantly and still be used cost-effectively. Conduct an efficiency potential analysis and economic screening process to identify the most cost-effective mix of new program targets. Include consideration of energy efficiency's role as a potential reliability tool and how its costs in that context compare to other options.
- *Leverage Federal and State Programs.* Explore opportunities to work with federal programs such as ENERGY STAR and to coordinate PBF implementation with other state programs, such as resource planning and portfolio management.
- *Measure and Communicate Results.* Measure results, evaluate the effectiveness of the PBF, and report progress annually. Communicate the benefits of PBF-funded energy efficiency programs to state legislatures, PUCs, and other stakeholders. Document lessons learned and opportunities to enhance the program's effectiveness.

Information Resources

Information About States

Title/Description	URL Address
California Measurement Advisory Council (CALMAC). This Web site provides access to independent evaluation reports on energy efficiency programs in California and elsewhere.	http://www.calmac.org/
California Order Instituting Rulemaking to Examine the Commission's Future Energy Efficiency Policies, Administration and Programs: Interim Opinion on the Administrative Structure for Energy Efficiency: Threshold Issues (Rulemaking 01-08-028). This order addresses threshold issues on administrative structure including planning, oversight, and management of energy efficiency programs, including decisions on what programs to fund with ratepayer dollars.	http://www.cpuc.ca.gov/word_pdf/FINAL_DECISION/43628.doc
California PUC Energy Efficiency Program Funding. This site provides information on the state's public goods charge with links to legislative language and the Web sites of California's four utilities.	http://www.cpuc.ca.gov/static/industry/electric/energy+efficiency/ee_funding.htm

Title/Description	URL Address
California Standard Practice Manual: Economic Analysis of Demand Side Programs and Projects. This document provides standardized procedures for evaluating cost-effectiveness of demand-side programs and projects in California.	http://www.cpuc.ca.gov/static/industry/electric/energy+efficiency/rulemaking/resource5.doc
Cost-Effectiveness Policy and General Methodology for the Energy Trust of Oregon. In this paper, the Energy Trust of Oregon, Inc. describes its methodology for comparing the cost of energy efficiency to conventional sources of electric energy from three perspectives (i.e., consumer, utility system, and societal).	http://www.energytrust.org/Pages/about/library/policies/costeffectiveness_030414.pdf
Energy Programs Consortium: Options for Developing a Public Benefits Program for the State of Kansas. The purpose of this report was to explore options for establishing a PBF to support the delivery of energy efficiency and renewable energy programs to help reduce the state's need to import energy resources and thereby strengthen the state's economy.	http://www.kansasenergy.org/KEC/KsPubBenFundStudy2004.pdf
Energy Trust Annual Report, 2004. This document reports on state PBF savings and generation, revenues and expenditures, performance measures, and specific projects around the state.	http://www.energytrust.org/Pages/about/library/reports/2004_Annual_Report.pdf
Nevada Energy Efficiency Strategy. Nevada has taken a number of steps to increase energy efficiency. This report provides 14 policy options for further increasing the efficiency of electricity and natural gas, and reducing peak power demand.	http://www.swenergy.org/pubs/Nevada_Energy_Efficiency_Strategy.pdf
NYSERDA Energy $mart℠ Evaluation Reports. This Web site contains program evaluation reports developed by NYSERDA and its contractors.	http://www.nyserda.org/Energy_Information/evaluation.asp
A Proposal for a New Millennium. This proposal includes a summary of the California Energy Commission's (CEC's) key recommendations for energy efficiency program priorities, funding levels, and administrative structure.	http://www.energy.ca.gov/reports/1999-12_400-99-020.PDF
Regulatory—Energy Efficiency Filings. This Web site contains monthly program reports on energy efficiency filed by SCE, Rosemead, CA.	http://www.sce.com/AboutSCE/Regulatory/eefilings/MonthlyReports.htm
State of Wisconsin Department of Administration—Focus On Energy Evaluation Reports. This site provides a number of recent evaluation reports that enumerate energy, environmental, and economic benefits from the Focus on Energy program.	http://www.doa.state.wi.us/section_detail.asp?linkcatid=288&linkid=8
System Benefits Charge. Proposed Operating Plan for New York Energy $mart Programs (2001–2006). This report outlines NYSERDA's operating plan for administering the PBF program in New York.	http://www.cleanenergystates.org/library/ny/NYSERDA_SBC_2001-2006.pdf
Wisconsin Public Benefits Programs Annual Report July 1, 2003 to June 30, 2004. This report includes an evaluation of Focus on Energy, the Wisconsin PBF for energy efficiency.	http://www.cleanenergystates.org/library/wi/2004FocusAnnualReport.pdf

General Articles About PBFs

Title/Description	URL Address
Clean Energy Initiative. This report explores the potential for joint investment in clean energy by foundations, state funds, and private investors.	http://www.cleanenergystates.org/library/Reports/CEI_Final_July03.pdf
Clean Energy States Alliance—CESA Member States and Funds. This Clean Energy States Alliance (CESA) Web site provides links to the state PBF sites.	http://www.cleanenergystates.org/Funds/
An Examination of the Role of Private Market Actors in an Era of Electric Utility Restructuring. The report by the American Society for an Energy-Efficient Economy (ACEEE) examines the role of the private sector in promoting energy efficiency and briefly discusses the influence of PBFs.	http://www.aceee.org/pubs/u011full.pdf
Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies. This ACEEE report provides an in-depth discussion and evaluation of PBF policy and implementation at the state level.	http://www.aceee.org/pubs/u041.pdf
A Framework for Planning and Assessing Publicly Funded Energy Efficiency. The primary objective of this report is to discuss the assessment of the cost-effectiveness of market transformation interventions.	http://www.pge.com/docs/pdfs/rebates/program_evaluation/evaluation/EE_Report_Final.pdf
Options for Developing a Public Benefits Program for the State of Kansas. This white paper describes current models of PBFs with recommendations for the state of Kansas on developing a PBF.	http://www.kansasenergy.org/KEC/KsPubBenFundStudy2004.pdf
Ratepayer-Funded Energy-Efficiency Programs in a Restructured Electricity Industry: Issues and Options for Regulators and Legislators. This report by Ernest Orlando, Lawrence Berkeley National Laboratory (LBNL) and ACEEE, discusses features of PBFs and provides recommendations for designing a PBF and choosing an administering body.	http://eetd.lbl.gov/ea/EMS/reports/41479.pdf
Summary Table of Public Benefit Programs and Electric Utility Restructuring. This site provides information, compiled by ACEEE, in tables on energy efficiency and renewable energy PBFs by state. It includes information on funding levels, the charge per kWh, the percentage of revenue, and the administering organization.	http://aceee.org/briefs/mktabl.htm
System Benefits Funds for Energy Efficiency. This report by the National Conference of State Legislatures (NCSL) describes how states can use system benefits funds to support energy efficiency investments. It provides sample legislative language for SBC legislation.	http://www.ncsl.org/print/energy/SystemBenefit.pdf
Trends in Utility-Related Energy Efficiency Spending in the United States. This presentation, at an AESP Brown Bag Lunch Series, shows general trends as well as specific state examples of energy efficiency spending.	http://www.raponline.org/Slides/AESP04kushler.pdf

Examples of Legislation

State	Title/Description	URL Address
California	**Assembly Bill 1890 on restructuring.** This bill, enacted in September 1996, established California's PBF.	http://www.leginfo.ca.gov/pub/95-96/bill/asm/ab_1851-1900/ab_1890_bill_960924_chaptered.html
Massachusetts	**Massachusetts Electricity Restructuring Act of 1997.** This act established the PBF program in Massachusetts.	http://www.mass.gov/legis/laws/seslaw97/sl970164.htm
New York	**A New York Public Service Commission Order and Opinion (PSC Case No. 94-E-0952: Opinion No. 96-12, May 1996).** This order established the PBF program in New York.	http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/ArticlesByCategory/E05EBC3E5C3E79B385256DF10075624C/$File/doc886.pdf?OpenElement
	A New York Public Service Commission Order and Opinion (PSC Case No. 94-E-0952: Opinion No. 98-3, January 1998). This order discusses PBF implementation issues and identifies NYSERDA as the administering organization.	http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/ArticlesByCategory/86EBE0283819224285256DF100755FE5/$File/doc3640.pdf?OpenElement
Oregon	**Oregon Senate Bill 1149.** This bill contains legislative language outlining restructuring and establishing a PBF.	http://www.leg.state.or.us/99reg/measures/sb1100.dir/sb1149.en.html
Wisconsin	**New Law on Electric Utility Regulation—The "Reliability 2000" Legislation (Part of 1999 Wisconsin Act 9).** This informational memorandum describes the provisions in 1999 Wisconsin Act 9 (the 1999–2001 Biennial Budget Act), relating to public utility holding companies, electric power transmission, public benefits, and other aspects of electric utility regulation.	http://www.legis.state.wi.us/lc/3_COMMITTEES/JLC/Prior%20Years/jlc99/pubs/im99_6.pdf

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WI DOA. 2004. Wisconsin Public Benefits Programs Annual Report July 1, 2003 to June 30, 2004. Department of Administration (DOA), Division of Energy, Madison, WI.	http://www.cleanenergystates.org/library/wi/2004FocusAnnualReport.pdf